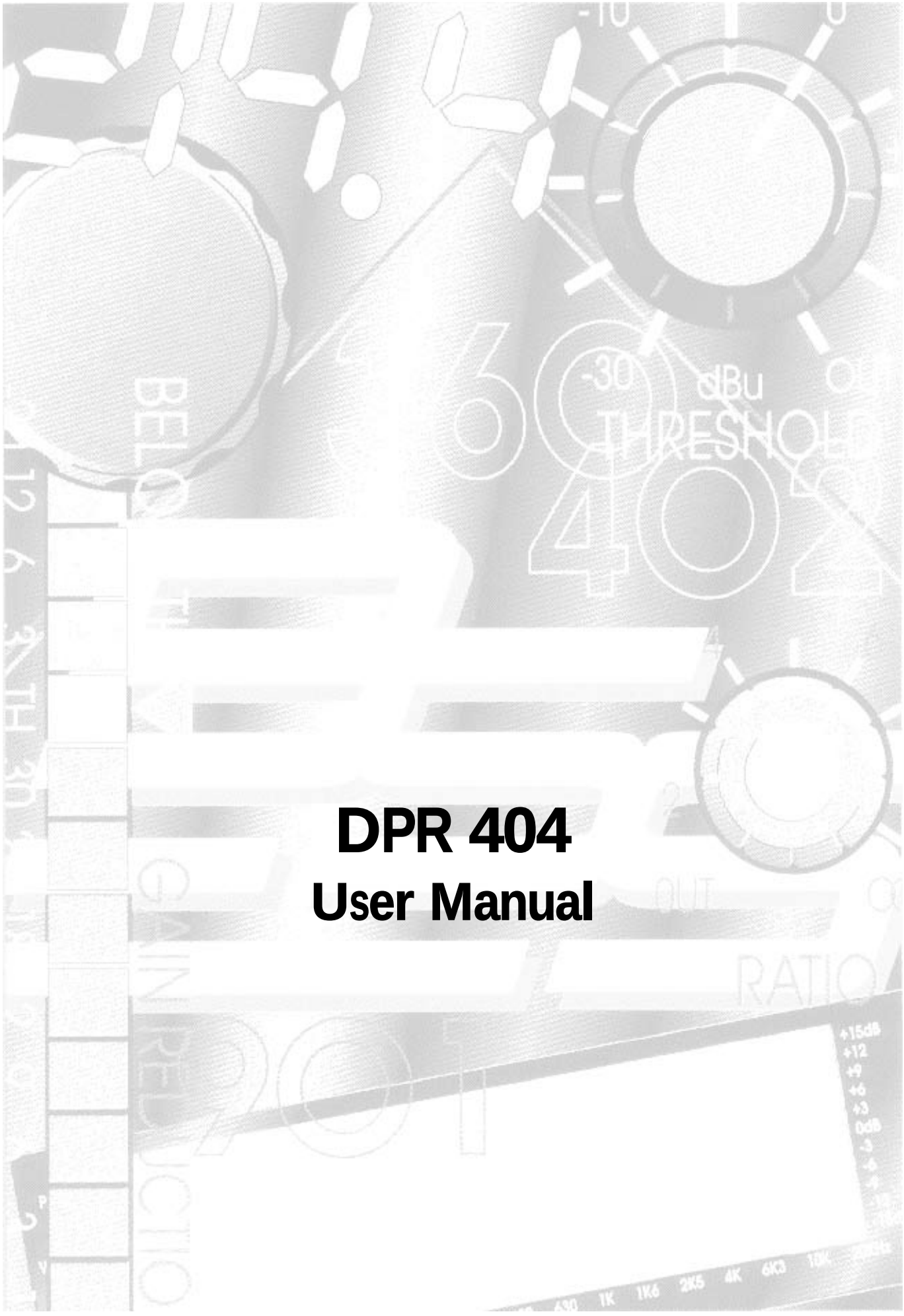


DPR 404

User Manual

V3.0 JMK 26 July 1999

CE This equipment has been tested and found to comply with the following European Standards for Electromagnetic Compatibility:

Emission Specification:	EN55013	(1990)	(Associated equipment)
Immunity Specification:	EN50082/1	(1992)	(RF Immunity, Fast Transients and ESD)
Mains Disturbance:	EN61000/3/2	(1995)	

For continued compliance ensure that all input and output cables are wired with cable screen connected to Pin 1 of the XLR. The input XLR Pin 1 on BSS equipment is generally connected to chassis via a capacitor to prevent ground loops whilst ensuring good EMC compatibility.

We have written this manual with the aim of helping installers, sound engineers and musicians alike get to grips with the **DPR-404** and obtain its maximum capability.
If you are new to BSS products, we recommend that you begin at the start of the manual. If, however, you are already familiar with the intended application, and just want to get the unit installed without delay, then follow the highlighted sections.
We welcome any comments or questions regarding the **DPR-404** or other BSS products, and you may contact us at the address or World Wide Web site given in the warranty section.

Contents

1.0	**The BSS DPR-404**	**5**
2.0	**Unpacking**	**6**
3.0	**Mechanical Installation**	**6**
4.0	**Earthing Requirements**	**7**
5.0	**Mains Power Connection**	**8**
7.0	**Audio connections**	**12**
7.1	Balanced wiring	12
7.2	Unbalanced wiring	12
7.3	Ground loop control	12
7.4	Linked operation	13
8.0	**Controls**	**14**
8.1	IN	14
8.2	Gain	14
8.3	Ratio	14
8.4	Attack/Release	14
8.5	Below TH meter	14
8.6	Gain reduction meter	14
8.7	De-ess	14
8.8	FREQ	14
8.9	Link	15
8.10	Link master LED	15
8.11	Main power fuse	15
9.0	**Rear panel controls**	**16**
9.1	Mains voltage selector switch	16
9.2	Mains power switch	16
9.3	Mains voltage selector switch	16
9.4	External side chain insert	16
9.5	Electronically balanced input	16
9.6	Electronically balanced and floating output	16
10.0	**Compressors and Limiters**	**17**
10.1	The need for Gain Control	17
10.2	Compressors and Limiters	18

Contents

11.0	**The effect of Compression on sound**	**20**
11.1	Compression	20
11.2	Attack, Release and Ratio	21
11.3	De-essing	22
12.0	**Specifications**	**23**
13.0	**Service Section**	**25**
13.1	Transient suppressor replacement	25
13.2	Separating signal and chassis ground	26
14.0	**Warranty Information**	**27**

1.0 The BSS DPR-404

The DPR-404 is a compact and professional four channel compressor and de-esser. Based on the well established BSS subtractive gain reduction principle, it offers you four independent channels of high quality, musical compression and high frequency de-essing, with the minimum of operator controls. Designed to be quick and easy to operate by both skilled and novice engineers alike, it makes a compact economical alternative to the fully featured DPR-402 model.

The DPR-404 is the natural complement to the well established DPR-402 unit and will find many applications within professional audio where ease of operation is considered important along with lower cost without sacrifice to quality and musicality. Some of the important features to be found on each channel of the DPR-404 are:

- 30dB of gain reduction using BSS proprietary subtractive approach.
- Fully adjustable soft knee ratio up to 20:1 hard limit.
- Automatic adjustment of time constants with two user definable ranges.
- Output gain adjustment control with LED clip indicator. BSS proprietary activity meter showing below threshold signal level, gain reduction and usable range.
- Bypass in/out switching with LED indicator. Independent high frequency de-esser threshold control and tuneable filter allows selective de-essing simultaneously with compression.
- Twin LEDs show de-ess activity.
- Link switching allows adjacent channels to be linked for accurate stereo working.
- One DPR-404 can be selected to process two stereo channels, or one stereo channel and two independent mono channels, or four independent mono channels.
- Compressor side chain insert on rear panel 1/4" RTS jack.
- Electronically balanced inputs and outputs with optional transformer balancing.

Unpacking
Mechanical Installation

2.0 Unpacking

As part of BSS' system of quality control, this product is carefully checked before packing, to ensure flawless appearance. After unpacking the unit, please inspect for any physical damage and retain the shipping carton and all relevant packing materials for use should the unit need returning. A packet of spare fuses is supplied. Please keep them in a safe place.

In the event that damage has occurred, please notify your dealer ***immediately***, so that a written claim to cover the damages can be initiated. ***See Section 14***.

3.0 Mechanical Installation

A vertical rack space of 1U (1.75", 44.5mm) is required. If the unit is part of a transportable system, you must support the unit at it's rear by additional bracing or shelving . Failure to do so will impair reliability and invalidate the Warranty. Additional threaded M3 screw holes are provided on the rear sides to assist in providing proper support. Adequate ventilation must be provided for by allowing sufficient room around the sides and rear of the unit to allow free circulation of air. Forced cooling is not required. The internal power supply regulators are mounted on the case sides and use this as their heatsink. After a period of time in an enclosure, the metal case will feel hot to the touch, but this is quite normal and should not be a cause for alarm.

Fig 3.1 Unit dimensions.

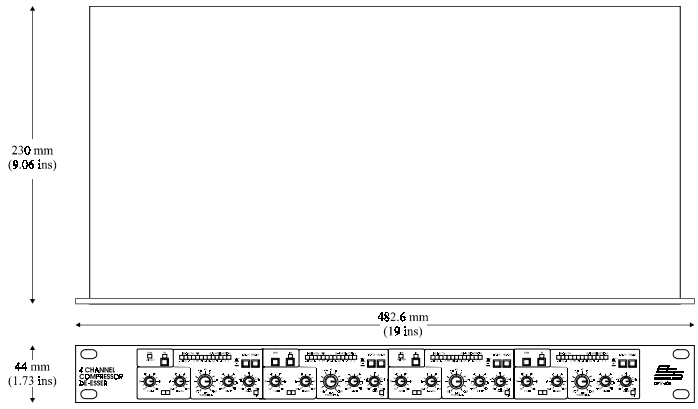
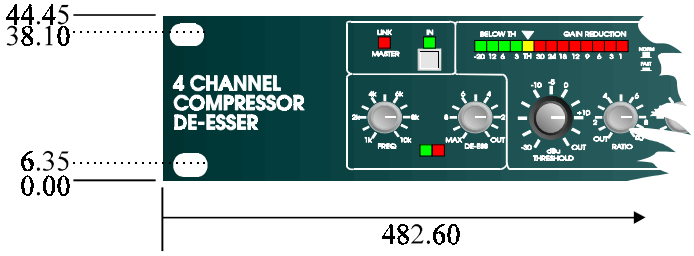


Fig 3.2 Rack dimensions.



Note: All dimensions in mm.

4.0 Earthing Requirements

WARNING! THIS APPLIANCE MUST BE EARTHED.

IMPORTANT: The wires in the mains lead are colour coded in accordance with the following code.

Green and Yellow.....Earth

Blue.....Neutral

Brown.....Live

As the colours of the wires in the mains lead may not correspond with the markings identifying the terminals in your plug, proceed as follows.

① The wire which is coloured Green and Yellow or Green must be connected to the terminal which is marked with the letter 'E' or by the Earth signal ⏚ or which is coloured Green and Yellow or Green.

② The wire which is coloured Blue must be connected to the terminal labelled 'N' or coloured Black or Blue.

③ The wire which is coloured Brown must be connected to the terminal labelled 'L' or coloured Red or Brown.

Those units supplied to the North American market will have an integral moulded 3 pin connector which is provided to satisfy required local standards.

The mains voltage selector switch provides a simple external adjustment to allow operation on all international AC power standards. The allowable ranges for the supply voltage are:

90VAC up to 132VAC on the 115V position and

190VAC up to 264VAC on the 230V position.

Outside these ranges the unit will not work satisfactorily, if at all. Voltages in excess of the maximum will probably cause damage. Voltages below the minimum will cause the power supplies to drop out of regulation, degrading the performance of the system.

Mains Power connection

5.0 Mains Power Connection

Voltage: The **DPR-404** operates on either 120 or 240 volt supplies. Use the voltage selector switch to choose the required voltage setting. (***See Figure 8.1***).

Frequency: Both 60Hz and 50Hz are acceptable.

Fig 5.1 Mains fuse on rear panel.

Grounding: The **DPR-404** must always be connected to a 3-wire grounded ('earthed') AC outlet. The rack framework is assumed to be connected to the same grounding circuit. The unit must NOT be operated unless the power cables ground ('earth') wire is properly terminated - it is important for personal safety, as well as for proper control over the system grounding.

AC Power Fusing: The incoming mains power is fused within the DPR-404 by the fuse holder mounted on the rear panel. If it needs to be replaced it must be properly rated as:

20mm T160mA for 240v AC

T250mA for 120v AC

It is most important for continued safety that this specification is adhered to, and you will have found that spare fuses of this rating are supplied together with your unit and manual. It is very unlikely that this fuse will fail during normal use, and must be treated with some caution as to the cause, if it should do so. One of the most likely reasons will be following the incorrect setting of mains voltage switch on the rear panel. Another reason can be the inadvertent connection of line to line rather than line to neutral phase voltages when using a three phase power connection. In either case, the internal transient suppressors (VDRs) can become damaged. If so, they'll consistently blow replacement fuses. You can be assured that they have protected your unit from damage, that the cost of replacement is small and that the VDR's demise has saved the much higher cost of 'blowing up' an entire unit. If blown, the VDRs will need removal to allow further use of your unit.

If you believe this has happened, please ***refer to section 13.1*** for the removal and replacement procedure. They should be replaced as soon as possible to ensure continued protection.

Power ON: This is indicated the green 'ON' LED located under the CH 'IN' switches. If this LED is not lit when power is connected and the 'POWER' switch is depressed, ***see section 16***.

Getting to know the DPR-404

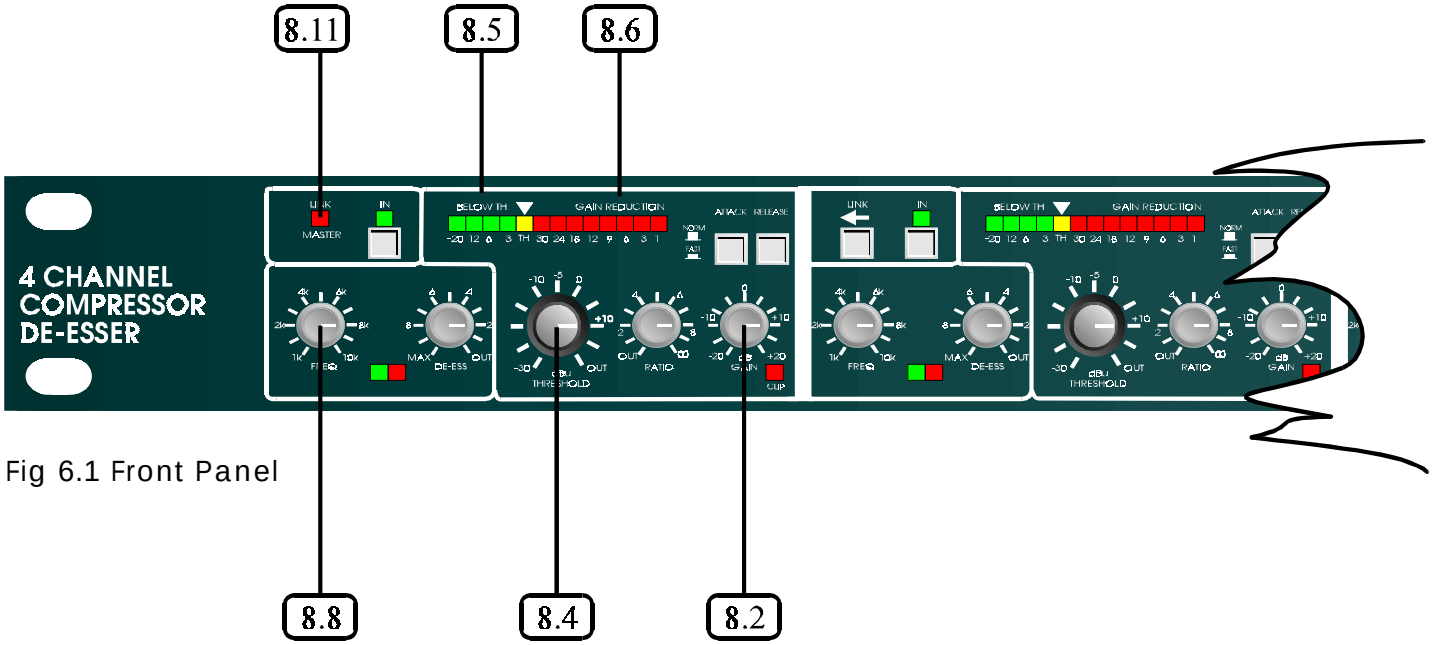


Fig 6.1 Front Panel

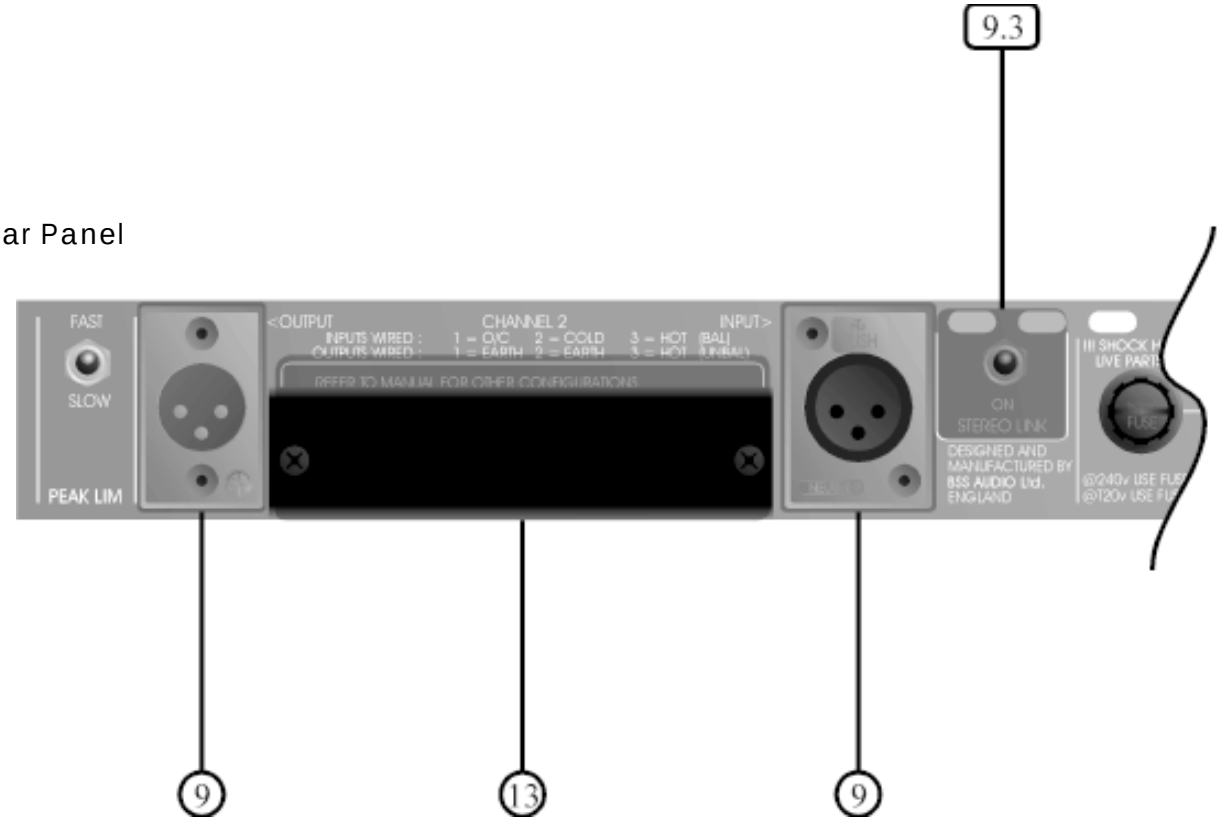
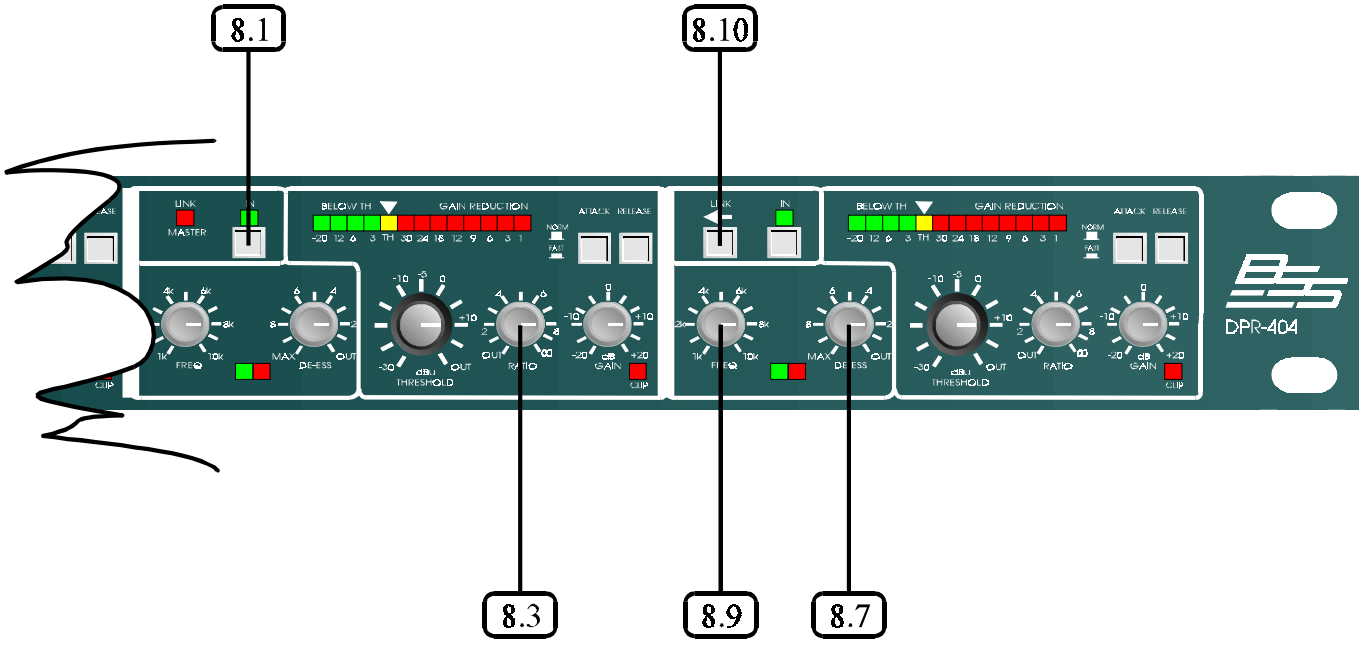
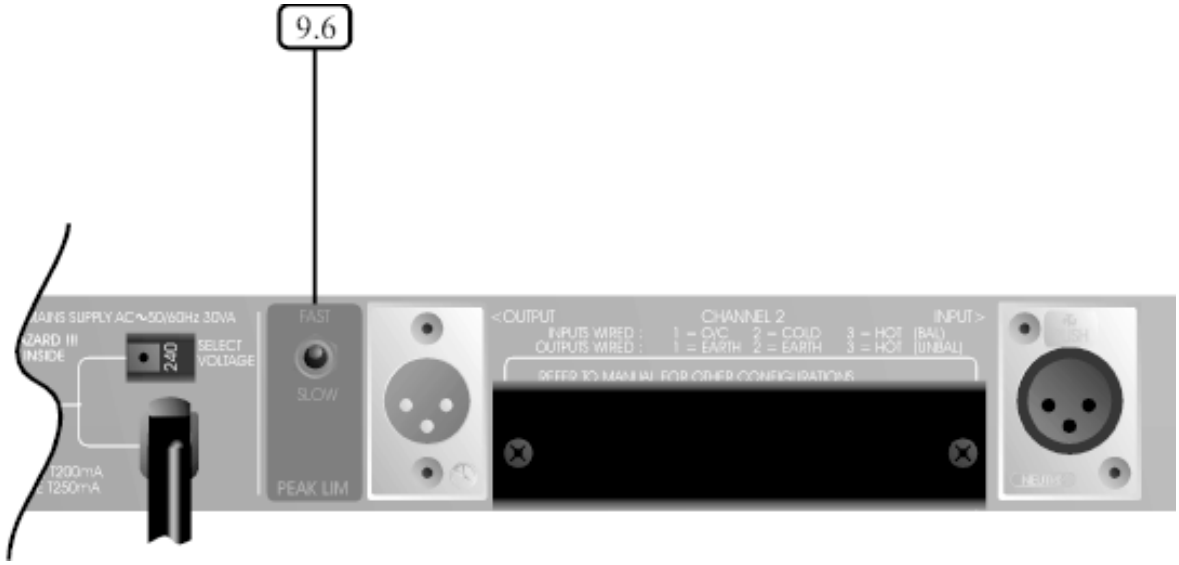


Fig 6.2 Rear Panel

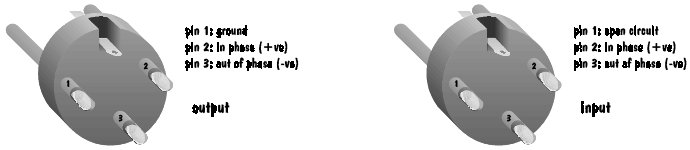




All numbers in bubbles refer to Section numbers.

7.0 Audio connections

The DPR-404 audio inputs are RFI filtered and electronically balanced, with the outputs electronically balanced and floating. They are designed to operate at any signal level up to +20dBu and will drive into loads of 600 ohms or greater. They will be 'fuss free', regardless of your installation's complexity. Note that pin 1 of the input XLR is not connected to ground.



7.1 Balanced wiring

Whether your system is wired to a 'pin 3 hot' or a 'pin 2 hot' convention will not matter as long as your wiring to both the input and output 3 pin XLR connectors are the same . As is common with all other BSS equipment of this type, we follow the convention of 'screen goes forward with the signal'. Input cable screening therefore needs to be derived from the signal source end as pin 1 is ground lifted for the inputs. You should use high quality audio cable with 2 cores + screen for low noise and reliability, and to sidestep potential problems.

7.2 Unbalanced wiring

If the equipment driving the DPR-404 has unbalanced outputs then you will need to add a wire jumper such that the screen connection on Pin 1 of the XLR is shorted to either Pin 2 or Pin 3, depending on the wiring convention of the unbalanced equipment. If the equipment being connected to the DPR-404 outputs have only unbalanced inputs, then we recommend that you still use a balanced (i.e. 2 core shielded) cable. The interconnecting cable should have it's screen grounded by pin 1 of the DPR-404 output, the pin 3 output should be connected the unbalanced input 0v ground, and the pin 2 output should be connected to the live input. There should be no connection between the cable screen and the 0v/chassis ground connection of the unbalanced equipment. Strict adherence to this will help to eliminate potential ground loop hums by removing signal currents from the cable screen.

7.3 Ground loop control

Adherence to the wiring conventions noted above within a fully balanced signal system will yield the best possible results with none of the problems normally associated with interconnected audio equipment. Wherever possible, cable screens should not be connected to any signal pin, but rather left to perform a cable shielding function only. Where it is not possible to control all of the external cabling, it might become necessary to have the internal electronic ground of your unit separated from the case safety ground. Provision is made internally within the DPR-404 to separate these two grounds at a convenient point, or to add a suitable impedance network as part of a house system requirement. Under no circumstances should the safety ground wire be removed from the mains AC power connector as an interim measure to achieve similar results. ***Please refer to section 13.2***, for information on this procedure.

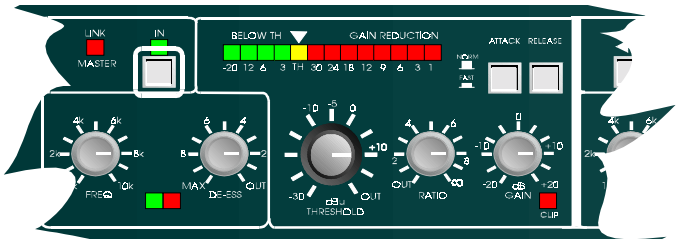
7.4 Linked operation

For stereo program processing, channels 1 and 2 can be linked together by selecting the LINK switch on channel 2. Channel 1 will assume the master role, such that threshold, ratio, attack and release for channel two are equal to and controlled by channel 1 with the side chain controlling signal being the mono sum of both channels. This facility is also repeated for the second pair, channels 3 and 4. HF de-essing is similarly treated, when using the LINK mode. When processing stereo program, it is always important to maintain the stereo imaging and prevent an audible shift in positioning. Channels 1 and 2 plus channels 3 and 4 can be selected to work as linked stereo pairs enabling a stereo program to be successfully processed. Selecting the LINK switch on channel 2 (or channel 4) re-connects the side chain circuitry such that channel 1 (or channel 3) now derives the controls voltages for the summed left/right program signal and applies it equally to both channels. Channel 1 (or channel 3) is called the master, whilst channel 2 (or channel 4) the slave. The master channels threshold, attack, release and ratio controls will now control both master and slave channels simultaneously, with those on the slave channel becoming inoperative.

8.0 Controls

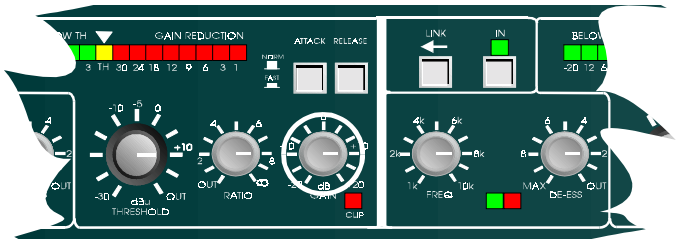
8.1 IN

When depressed the processing is engaged and the green LED lights in confirmation. When released, processing is disabled, the LED is off and the incoming signal passes to the output unchanged and at unity gain.



8.2 Gain

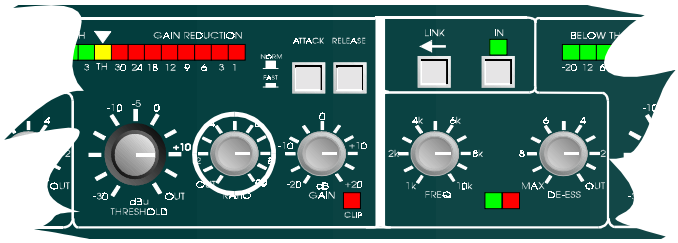
Output level control used to restore signal after processing, providing ÿ 20dB of adjustment range. Operation of this control has no affect on threshold setting and should the output signal level approach +20dBv the adjacent red LED will illuminate to indicate onset of clip.



8.3 Ratio

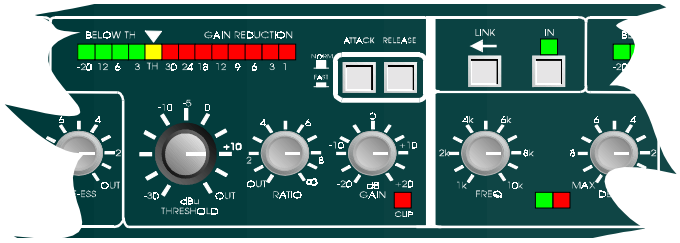
Used to set the scale factor for gain reduction, providing a range of 1:1 to 20:1. Low ratios have soft knee developing into hard limit at 20:1. When set to ‘out’, no compression will occur even if signal level is exceeding threshold.

Sets the operating level at which compression will occur, adjustable from +20dBv to -30dBv. Signal level in relation to threshold point is shown on the gain reduction meter, such that when the TH LED is passed, compression will commence.



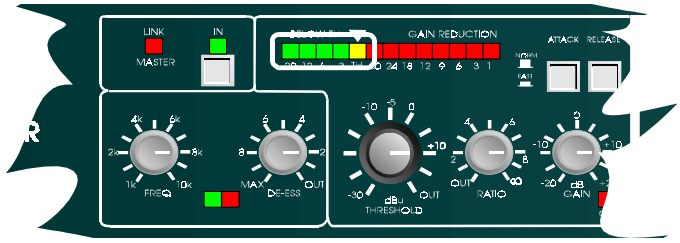
8.4 Attack/Release

With the switches released, the function is automatically set and is program related, such that it follows the signal requirements for general vocal and mix program signals. (It closely follows the 'auto' mode on the DPR-402 unit). When depressed, the function is again automatically set and program related but is scaled to suit more transient program material such as percussion.



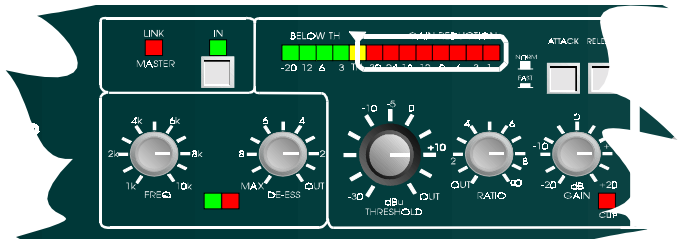
8.5 Below TH meter

Signal indicator showing the input signal level relative to the point at which compression will commence. Anticlockwise rotation of the threshold control brings the input signal into the compression window and determines the threshold point. The half illuminated orange LED indicates the threshold point, above which, compression occurs.



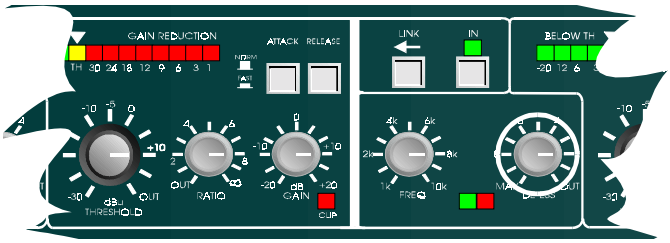
8.6 Gain reduction meter

Shows the amount of gain reduction in dBs, being the difference between the input and output signal levels. The scale increases from right to left such that at all times the illuminated LEDs show the actual amount of gain reduction used, whilst the non illuminated LEDs give an indication of the range of reduction left from the maximum of 30dB.



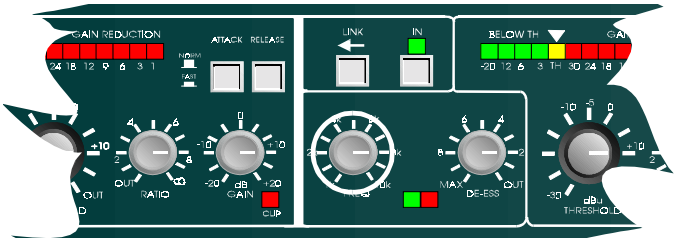
8.7 De-ess

Threshold control for the high frequency de-esser circuitry. It works independently of the main compressor section and can be used simultaneously with it. It uses a second subtractive element that works to reduce only those high frequencies set by the FREQ control, leaving the other frequency content of the program unprocessed. De-essing can be equally implemented on both a full program mix or on an individual track, without fear of introducing audible side effects.



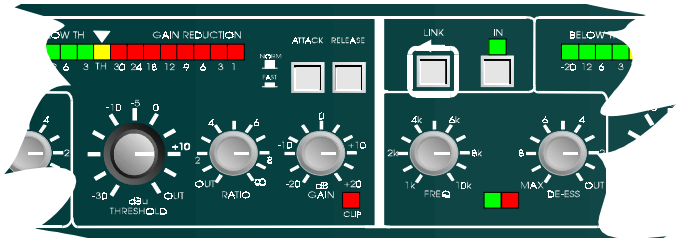
8.8 FREQ

Sets the operating frequency range for the HF de-esser. Control range is from 1kHz to 10kHz allowing precise alignment with sibilant frequencies without affecting other parts of the program signal.



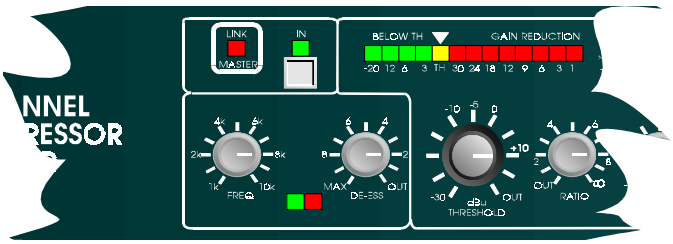
8.9 Link

When depressed, channel one and channel two are linked together to form a stereo pair. Channel one becomes the master and controls both the threshold, attack, release, and ratio settings for both channels. The control side chain signal is also mono summed from both channel inputs to ensure accurate stereo processing. The de-essing function is linked in a similar manner. When released, the channel is independent and operated from it's own controls.



8.10 Link master LED

When illuminated, indicates that the channel is acting as the master for a stereo pair, as selected by the link switch.



8.11 Main power fuse — 20mm, T160mA for 240v AC voltage setting and T250mA for 120v AC voltage setting

9.0 Rear panel controls

9.1 Mains voltage selector switch — Allows operation from 90v-130v or 190v-250v 50/60Hz AC mains voltage.

9.2 Mains power switch — Turns the unit on/off.

9.3 Mains voltage selector switch — Allows operation from 90V-130V or 190V-250V 50/60Hz AC mains voltage.

Rear panel controls

9.4 External side chain insert

Offers a line level insertion point, on an RTS jack, into the control side chain.

Connections are:		
	Ring:	Signal output from 470 source.
	Tip:	Return input to 10k.
	Sleeve:	0v ground.

9.5 Electronically balanced input

Maximum input is +20dBu into 10kohms.

The pin connections are:
Pin 1: Open circuit/no connection.
Pin 2: Hot (+).
Pin 3: Cold (-).

Note: Transformer balancing is available as an option.

9.6 Electronically balanced and floating output

Maximum output is +20dBu into 600ohms.

The pin connections are:
Pin 1: Ground/Chassis.
Pin 2: Hot (+).
Pin 3: Cold (-).

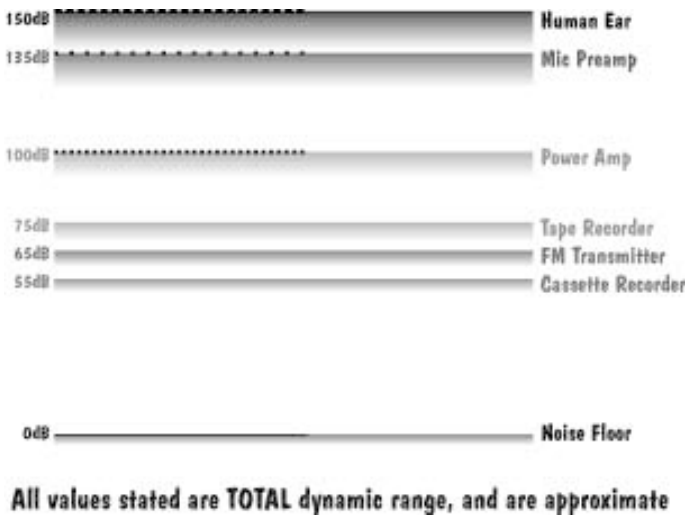
Note: Transformer balancing is available as an option.

10.0 Compressors and Limiters

10.1 The need for Gain Control

The human ear excels in its ability to detect an extremely wide range of sound levels. These can range from the quietest whisper to the roar of a jet aircraft. When we attempt to reproduce this large range (dynamic range) of sounds with amplifiers, tape recorders or radio transmitters, we run into one of the fundamental limitations of electronic or acoustic equipment. In some cases, such as amplifiers, the dynamic range available is quite good. However, equipment such as tape recorders and radio transmitters have a restricted usable dynamic range.

Fig 10.1 Dynamic Range



What limits the available dynamic range of this equipment is its inherent noise floor at the bottom end, and the maximum input signal resulting in an acceptable amount of distortion at the upper end ***(See figure 1.2)***. The usable dynamic range sits in between these two limits, and it is common practice to operate a piece of equipment at a level that is somewhat below the upper distortion point, leaving a margin of safety for the unexpected transient loudness peaks present in program material. The safety margin is known as headroom, and is generally in the range of 10 to 20dB. Lowering the standard operating level to increase headroom helps distortion, but moves the average program level nearer to the noise floor, thereby compromising the signal to noise performance.

Compressors and Limiters

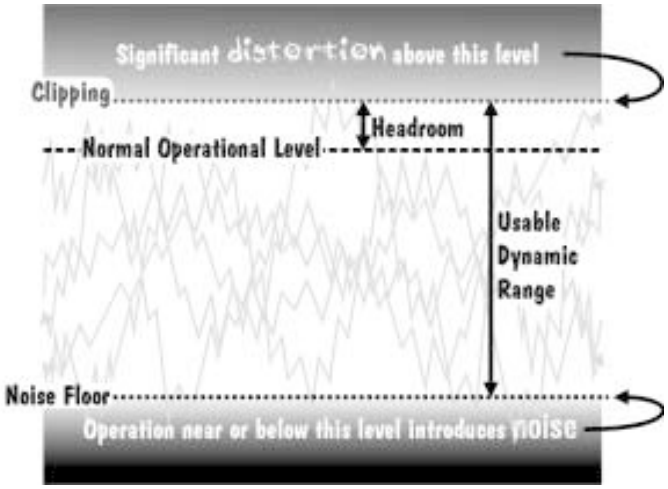


Fig 10.2 Operating level and Headroom

It therefore becomes apparent that to get the most out of an audio system, the standard operating level must be kept as high as possible without risking distortion.

One solution to this problem is for the operator of the equipment to be continuously monitoring the program, and manually adjusting the gain to suit the moment. When the program is quiet, the gain can be increased, and when the program is loud the gain can be reduced. However, in most types of program there are instantaneous short duration level peaks or transients, which would be difficult to anticipate and impossible to respond to in the required time. Even a sound engineer with the quickest reflexes could not bring the gain knob or fader down quickly enough.

The need therefore arises for a fast acting automatic gain controlling device which will track the program material constantly, and which will always adjust the gain to maximise the signal to noise performance without incurring distortion. This device is called a compressor or limiter, and is one part of the **DPR-404**.

10.2 Compressors and Limiters

Compressors and limiters have closely related effects, and in general a limiter will reduce gain very strongly once a certain level has been reached, whereas a compressor will act gently, but over a much wider range of volume levels.

A limiter will continuously monitor program levels, but only commence to reduce gain once the level has exceeded a preset amount. This point is called the threshold level. Any program level in excess of the threshold will immediately be reduced to this threshold level.

A compressor will also continuously monitor the program and has a threshold level. However, program signals in excess of this threshold will be progressively reduced by an amount (ratio) depending on the degree to which it initially exceeds the threshold. Generally, threshold levels for compressors are set below the normal operating level to allow them to reduce the dynamic range of the signal gradually, so that they are acceptable to following equipment. For limiters, the threshold point will be set above the operating level in order to provide a maximum level for signals to following equipment.

In the DPR-404, gain reduction is achieved by using a proprietary subtractive circuit which minimises signal degradation and has a maximum attenuating range of 30dB. The THRESHOLD control is used to position the input program signal into the window of operating range for the circuit. Rotating the control anticlockwise from the 'out' position will bring the signal onto the BELOW TH meter. Gain reduction will commence once the dimly lit TH LED is exceeded, and the actual amount of reduction in gain shows on the GAIN REDUCTION METER, calibrated in dBs. The RATIO control is used to scale the reduction effect once threshold is exceeded, and the scale numbers relate to the amount of program signal, in excess of threshold, that will cause a 1dB increase in output level. For general compression a ratio of between 2:1 and 4:1 is an optimum starting point. For limiting a ratio of between 10:1 and 20:1 is to be used.

The response of the DPR-404 to signals above threshold is further defined by the ATTACK and RELEASE controls. These control how quickly gain reduction occurs and, following signal level dropping below threshold, how slowly the gain reduction is removed and unity gain restored. It is important that these controls are set to suit the particular program envelope and the DPR-404 is provided with two automatic ranges that are designed to carefully optimise these times to the signal. With the switches in their released position, the times are set to work within a range typical of vocals, mix program material and other non transient sources. When compressing very fast percussive sounds it is recommended that the fast auto modes are selected by depressing the switches. Any combination can be used and it is best that the optimum setting be found by listening for the desired effect. In general too fast an attack will cause high frequency distortions and clicking sounds, whereas too fast a release will give level pumping effects and low frequency distortions. Because compression is a gain reducing effect, the output signal is often at a lower level than normal.

The GAIN control, scaled in dBs, is provided to restore the output signal level. It is positioned after the reduction process and therefore has no effect on the threshold setting. The associated red LED will give an indication that output level is approaching the maximum operating level for the channel. Should you wish to bypass the compress ion effect, releasing the IN switch will restore the output signal to that of the input. The green LED illuminates to show when the channel is active. The LED metering remains active even in the bypassed mode, so that some initial setting up can be done before selecting the IN.

11.0 The effect of Compression on sound

11.1 Compression

Consider an input signal which is applied to two units, one having its threshold point set 10dB higher than the other. Since the compressor only affects signals that exceed the threshold level, the signal with the lower threshold applied will be more affected than the other. Referring to figures

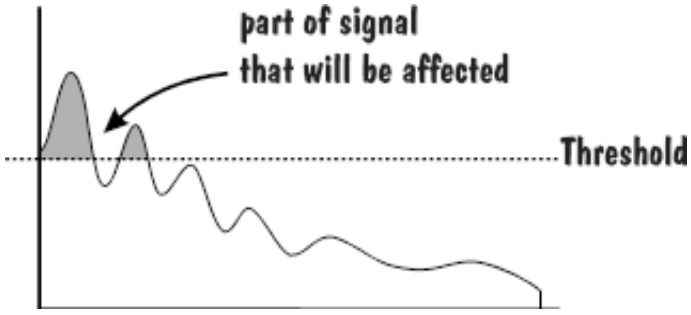


Fig 11.1a High threshold level

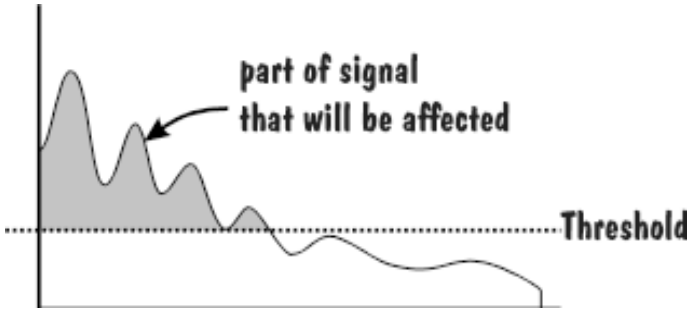


Fig 11.1b Lower threshold level

2.2a & b, assuming that all other controls on both channels are set identically with gains equalised, it is immediately apparent that the signal processed with the higher ratio is said to have been limited, whereas the signal with the lower ratio is said to have been compressed.

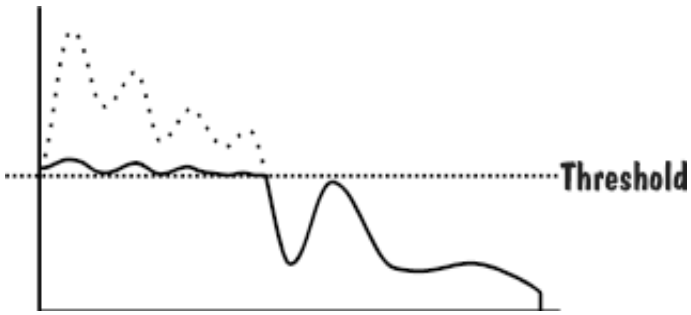


Fig 11.2a Effect of compression with high threshold

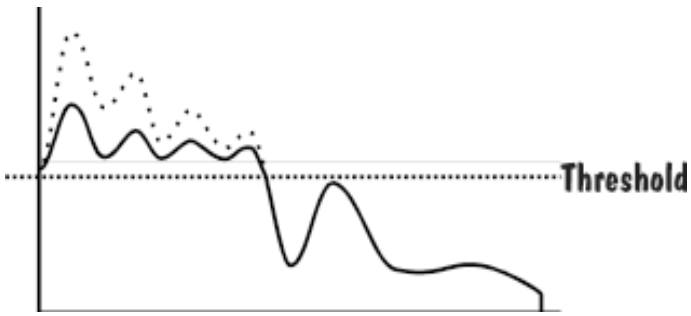


Fig 11.2b Effect of compression with lower threshold

Comparing the input and output waveforms for the compressed mode, the loudest portions of the signal have been effectively decreased in level, and if the *gain* control is adjusted to compensate for this, the quieter portions will be increased. The net effect, therefore, is for both ends of the dynamic spectrum to be pushed (or squeezed) towards each other. This squeezing effect of compression is important to remember, and provides a major difference between compression and limiting. I.e. Limiters do not make-up the gain reduction.

The range provided by the DPR-404 on its *ratio* and *release* controls is sufficient to allow its use either as a compressor or limiter. For limiter applications, the *release fast* switch should generally be **out**.

11.2 Attack, Release and Ratio

Attack is the amount of time that elapses before the compressor begins to attenuate the output level after the threshold point has been exceeded. For sounds such as a snare drum or hand clap, fast attack is desirable so that the compressor responds in time to control the peaks.

Release is the amount of time taken for the compressor to return to normal gain after the input signal has fallen BELOW the threshold point.

Ratio determines the ratio of change on output level to changes in input level for all signals that exceed the threshold. ***Returning to section 1.1*** where the idea of manual controlling the level of the program was discussed, the operator would reach over and turn down the volume if signal levels were approaching distortion. At this point he now has an option: Either reduce the level so that there is nothing exceeding his desired maximum level, or reduce the level by a small amount so that his output is slightly greater than that of his preferred maximum but not as loud as it would have been if no action had been taken. This action is known as the ratio. A ratio of 1:1 indicates that the output will linearly track the input level of the threshold. i.e. For every 1dB of input over the threshold point, there will be 1dB of output. A ratio of 2:1 indicates that for every 2dB of input level above the threshold, there will be a corresponding increase of 1dB in the output level. A ratio of 10:1 indicates that for every increase of 10dB of input level, there will be a corresponding increase of 1dB in the output level, and so on. A ratio of infinity:1 indicates that no matter how loud the input signal goes above the threshold, the output will remain constant at the threshold point. It is worth noting that a hard or infinite ratio limit has applications in some specialised situations, but in general it is neither appropriate nor necessary, and is likely to cause noticable side effects in the sound.

De-essing and Peak Limiter

11.3 De-essing

A common problem encountered when amplifying or recording the human voice is the large amount of high frequency energy heard as the sibilant (*Sss*) sound. These sounds can reach levels considerably greater than the normal voice level, and can result in signal break-up or distortion. It is possible to control these sounds by using a compressor which is specially configured to respond to, and only reduce, these high frequencies. Selective high frequency compression is generally called de-essing, as it removes the high frequency *Sss* content from the program. The DPR-404 de-essing circuitry is specially configured to enable precise selection and control of high frequency sibilance. The variable FREQ control tunes not only high pass filters in the controlling side chain but also in the main subtracter so that gain reduction will only affect the high frequencies, leaving the rest of the program unprocessed.

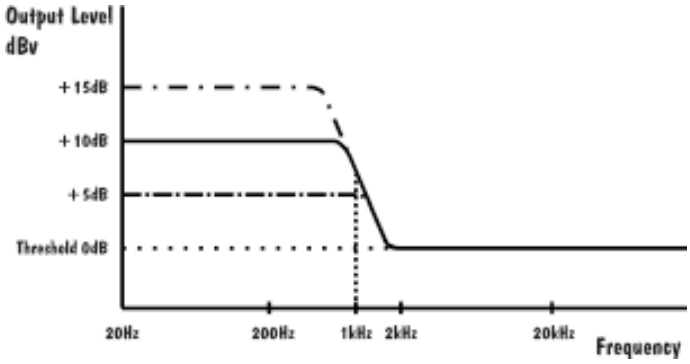


Fig 12.1 Effect of de-essing on output

In use, the frequency control is adjusted such that the filter is capturing the correct high frequency sibilance, and the DE-ESS level control, working like a threshold control, is used to set the correct degree of gain reduction. The associated green LED indicates the start of de-essing action, whilst the red LED indicates the maximum 10dB compression. The dynamic attack and release settings are automatically adjusted by the circuitry depending on the program type.

12.0 Specifications

Input section

12k ohm electronically balanced, +20dBu (+20dBv) maximum input level via a 3 pin male XLR cable plug. Common Mode rejection: > -50dB, 20Hz to 20kHz

Input section

Electronically balanced and floating, capable of driving +20dBu (+20dBv) into 600 ohms or greater via an XLR female cable plug.

Frequency response:	**+/- 0.5dB**, 20Hz to 20kHz (Low pass at 29kHz)
Noise:	**<-86dBu**, all controls set flat, 22Hz - 22kHz
Distortion:	**Unity gain** +10dBv output, no compression
THD:	**< 0.05%** (20Hz-20kHz)
IMD:	**< 0.02%** (SMPTE method)

Input section

Threshold Range:	**+20dBv to -30dBv** continuously variable
Ratio:	**1:1 to 20:1** continuously variable (Soft knee for low values with hard limit at 20:1)
Maximum Range:	**30dB**
Attack Time:	**Normal:** **Program dependent**, with **200uS** for fast transient overdrives. **Fast:** **Program dependent**, with **20uS** for fast transient overdrives.
Release Time:	**Normal:** Typically **10 mSecs** for 63% recovery from a 10dB 4mSecs overdrive, and **1 Sec** for 10dB 40 mSec **Fast:** Typically **2 mSecs** for 63% recovery from a 10dB 4mSecs overdrive, and **300 mSec** for 10dB 40 mSec

Output section

Threshold Range:	**+20dBv to -30dBv** continuously variable
Ratio:	**20:1** at and above twice the set frequency
Freq Range:	**1kHz to 10kHz continuously variable**. Attack times are those as measured to achieve 63% of final gain reduction with a step signal of 8dB above threshold. Release times are those as measured to achieve 63% recovery of open gain or removal of a signal 8dB above threshold. The frequency at which 3dB of gain reduction occurs for 10dB of signal drive above threshold. 10dB of gain reduction will occur at and above twice this frequency
Metering:	**13 way dB calibrated LED meter** display showing signal level below threshold, threshold point and gain reduction
Stereo Link:	Front panel switch selects Channels 1/2 and 3/4 to become stereo pairs. Channel 1 and channel 3 assume master function for their pair. Side chain control signal is mono summed

Specifications

Side chain insert: Rear panel RTS jack accesses side chain for inserting other equipment at line level. Connections are:

Ring:	Signal output from 470 ohms source
Tip:	Return input into 10kohms
Sleeve:	0v ground

Power: **AC 50/60Hz** 120v/240v switched externally giving operation range of 90-132v and 180-264v. Anchored 2m power cord

Size: **482 x 44 x 282mm**
19" x 1U x 11.10"

Weight: **4.1kg** gross shipping

Options

Transformer balancing for input and output.

!!! CAUTION - Important Notes !!!
SERVICE SECTION

13.0 Service Section

13.1 Transient suppressor replacement

The primary of the input transformer is protected against high voltage spike interference by two voltage dependent resistors (VDR). These provide a momentary short circuit to voltage peaks in excess of the normal power voltage rating.

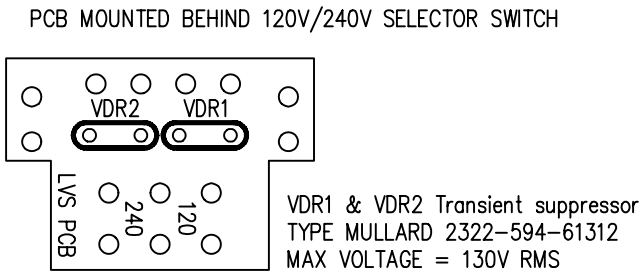
Should the DPR 404 be inadvertently connected to 3-phase line/line voltages or to 240V when selected for 120V, or any other incorrect voltage, these suppressors are likely to fail in a short circuit mode. This will be demonstrated by repeated mains fuse failure at power up.

Even in this case of extreme over-voltage, the DPR 504 is protected against failure, and the simple removal of the damaged suppressors will allow the unit to be used again. It is important, however, that they are replaced immediately to ensure continued protection.

Before attempting to remove the damaged suppressors, ensure that the unit is unplugged and totally isolated from any power supply.

Figure 13.1 shows the suppressors location on the voltage selector board.

Fig 13.1 Suppressor location



!!! WARNING - Refer all servicing to qualified service personnel !!!
Risk of electric shock if the unit is opened.
BSS Audio accepts no responsibility for injury subsequent to opening of the unit.

!!! CAUTION - Important Notes !!!
SERVICE SECTION

13.2 Separating signal and chassis ground

In some installations, it might be necessary to separate the electronic signal 0V ground from the chassis ground to avoid earth loops.

Since both the inputs and outputs of the DPR 504 are balanced, correct connector wiring should be alleviate this problem. Prior to continuing with this procedure, it is recommended that you recheck all audio wiring for correctness.

Should it be necessary, then the simple removal of an internal wire link accomplishes this task. *Refer to figure 13.2* for the location of this wire link.

To remove the wire link, you will need to remove the top cover of the unit, and then remove the top PCB, and 4 LED PCBs. The chassis link point will then be accessible, located between C512 and C502 labels (white silk screen) on the main PCB.

On no occasion should the incoming safety ground wire be disconnected from the line cord or from the internal chassis connection as an alternative to this procedure.

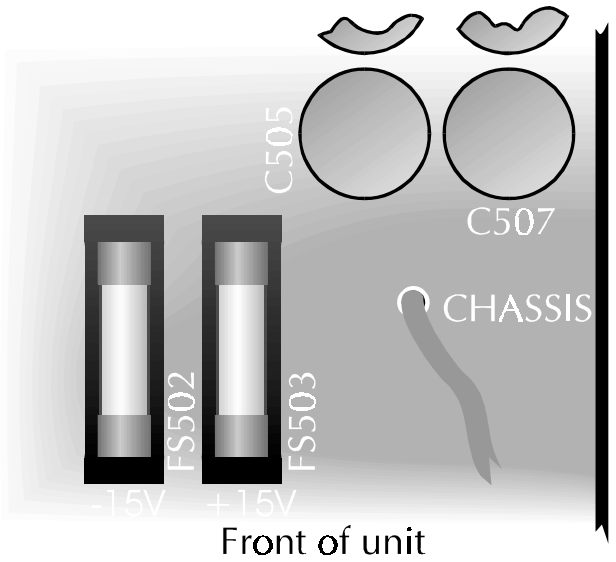


Fig 13.2 Chassis link location

!!! WARNING - Refer all servicing to qualified service personnel !!!
Risk of electric shock if the unit is opened.
BSS Audio accepts no responsibility for injury subsequent to opening of the unit.

14.0 Warranty Information

When sold to an end user by BSS Audio or a BSS Audio Authorised Reseller, this unit is warranted by the seller to the purchaser against defects in workmanship and the materials used in its manufacture for a period of one year from the date of sale.

Faults arising from misuse, unauthorised modifications or accidents are not covered under this warranty. No other warranty is expressed or implied.

If the unit is faulty it should be sent to the seller of the equipment, in its original packaging with shipping prepaid. The unit will be returned to you when the repair has been completed. If the unit was purchased witin the European Union, you may, as an alternative, return the unit to any other BSS distributor in the European Union.

You should include a statement listing the faults found. The unit's serial number must be quoted in all correspondence relating to a claim.

IMPORTANT We recommend that you record your purchase information here for future reference.

Dealer Name:

Dealer Address:

Post/Zip Code:

Dealer Phone No.:

Dealer Contact Name:

Invoice/Receipt No.:

Date of Purchase:

Unit Serial Number:

In keeping with our policy of continued improvement, BSS Audio reserves the right to alter specifications without prior notice.

The **DPR-404** was designed and developed by BSS Audio, Hertfordshire, England.

Phone (+44) (0)1707 660667. Fax (+44) (0)1707 660755.

World Wide Web address: http://www.bss.co.uk

Index

Index

A

Attack Time 21

B

Below Threshold. *See* Compression meters; Compression meters: Below Threshold

C

Chassis ground
separating from signal 26
Compression 20

D

Dynamic Range 17

E

Earthing 7

F

Front Panel 10
Fuses. *See* Mains Connection

G

Gain Reduction. *See* Compression meters: Gain Reduction
Getting to know the DPR-402 10
Grounding. *See* Grounding

H

Headroom 18

I

Installation 6

M

Mains Connection 8
Meter Input. *See* Compression meters: Meter Input

O

Output Level. *See* Compression meters: Input Level

P

Power ON. *See* Mains Connection

R

Rack space.. *See* Installation
Rear Panel 10

Index

Release time 21

S

Specifications 23

T

Threshold 14
Transient suppressor replacement 25

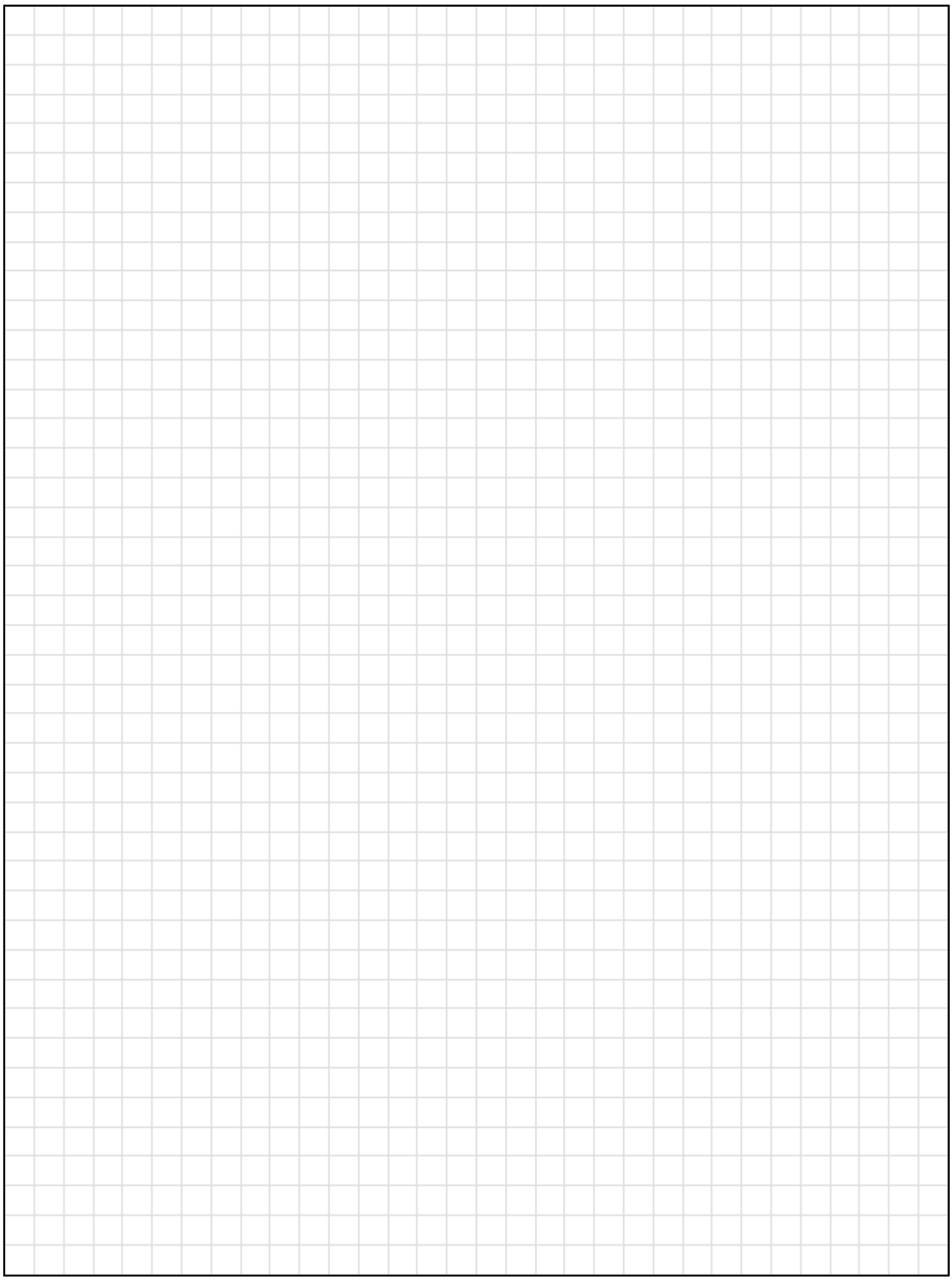
U

Unpacking 6

W

Warranty Info. 27

User Notes



User Notes